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# **IMPORTANT**

### THIS DOCUMENT IS BASED ON BETA CODE.

# FUNCTIONALITY MAY CHANGE IN THE PRODUCTION RELEASE.

## THE AUTHORS CAN NOT OFFER ANY ASSISTANCE WITH THE CONTENTS OF THIS DOCUMENT

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## 1. Introduction

This paper walks through the creation of Oracle's Automatic Storage Management (ASM) using a laptop running Windows 2000.

NOTE: This is not a proposal for a production architecture! The aim is to create a "sandbox" to demonstrate the main features of ASM and to learn the new techniques.

ASM uses the Stripe And Mirror Everything technique developed to ease the management of Oracle databases. Mirroring ensures that no data is lost and Striping ensures that all storage components are used equally with no hot spots.



### **Unstriped Disks**

### **Striped Disks**

Once implemented ASM uses disk groups and allows tablespaces and so tables to be created upon these disk groups. This removes the need for Logical Volumes, File Systems and Files to be managed thus dramatically reducing management requirements.



This paper outlines the pre-requisites needed for ASM, installs ASM and covers two hands on sessions to show the benefits of ASM.

## 2. Creating Logical Drives

2.1 Background to creation of Logical Drives

In order to implement Automatic Storage Management (ASM), we need to create logical drives that are unformatted and which ASM can use to create disk groups upon which the database tablespaces may be placed.

NOTE: In Windows, the standard file API cannot read a partition directly, so for ASM to access the disk we use a label – in this case this is the drive letter.

A step-by-step method for this is included below using Windows Disk Manager against Free Space on the laptop's hard drive.

There are other methods suitable to do this. If you prefer feel free to try a different method. Other methods that spring to mind include running crlogdr from the preinstall\_rac folder of Disk 1 of the Oracle9*i* Real Application Clusters software distribution or using Partition Magic.

In our example, we have twenty Gbytes of free space on the hard disk and we will create eight 1Gbyte logical drives, unformatted but with drive letters.

#### 2.2 Step by Step Method of creating Logical Drives using Windows Disk Manager

To run the Windows Disk Manager applet, right click on My Computer, click Manage and click Disk Management

💻 Computer Management								_ 🗆 🗙
Tree	Volume L	ayout	Туре	File System	Status	Capacity	Free Space	% Free
Computer Management (Local)  Computer Management (Local)  Cocal System Tools  Cocal System Information  Cocal System Information  Cocal Series and Receive Series  Cocal Users and Groups  Cocal Users  Co	©MHALLAS ₽SHARE (D:) P	artition artition	Basic Basic	NTFS FAT32	Healthy (Sy Healthy	19.53 GB 15.99 GB	6.14 GB 15.99 GB	31 % 100 %
Generations								
								<u>,</u>
	CP Disk 1 Basic 55.88 GB Online	MHALLAS 19.53 GB N Healthy (S	<b>:-UK (С:)</b> ЛТFS ystem)	SHARE 16.00 ( Healthy	E <b>(D:)</b> 58 FAT32	20. Fre	35 GB e Space	
•	Primary Partitio	n 📕 Extended	Partition Free	Space Logic	al Drive			

We will now create additional logical drives using storage allocated from the free space of your laptop's hard drive. Right Click on the Free Space and click Create Partition



#### Click "Next"

Create Partition Wizard	×
Select Partition Type You can specify what type of partition to create.	
Select the type of partition you want to create:	
C Brimary partition	
C Extended partition	
Description A logical drive is a volume you create within an extended partition on a basic disk.	
< <u>B</u> ack <u>N</u> ext > Can	cel

Click "Next"

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Create Partition Wizard			24 L
Specify Partition Size How big do you want the partition	to be?		
Choose a partition size that is s	naller than the maximum disk space.		
Maximum disk space:	20834 MB		
Minimum disk space:	7 MB		
Amount of disk space to use:	1024	🗄 мв	
			Cancol

Enter 1024 in the "Amount of disk space to use" and Click "Next"

Create Partition Wizard	×
Assign Drive Letter or Path You can assign a drive letter or drive path to a partition.	ĬĨĨ
Assign a drive letter     F:     F:     Mount this volume at an empty folder that supports drive paths:     Browse      Do not assign a drive letter or drive path	
< <u>B</u> ack <u>N</u> ext > Cancel	

Click "Next"

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reate Partitio	on Wizard		×
Format Par You can	<b>tition</b> customize the formatting of the p	partition.	
Specify	y whether you want to format this	s partition.	
۰	<u>Do not format this partition</u>		
01	Format this partition with the follo	owing settings:	
	Formatting		
	File system to use:	NTFS	
	Allocation unit size:	Default	
	⊻olume label:	New Volume	
	Perform a <u>Q</u> uick Format	$\square$ Enable file and folder compression	

Select "Do not format this partition" and Click "Next"

Create Partition Wizard		×
	Completing the Create Partition Wizard	
	You have successfully completed the Create Partition Wizard.	
	You specified the following settings:	
	Partition type: Logical Drive Disks Selected: Disk 1 Partition size: 1024 MB Drive letter or path: F: File System: None Allocation Unit Size: Default	
	To close this wizard, click Finish.	
	< <u>B</u> ack Finish Cancel	

Click Finish

Repeat "Create Partition" until you have eight 1Gbyte logical drives. Note that you may have to reboot if the Windows Disk Manager requests this. Your final layout should look along the lines of the following illustration.

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5 8000							4	J DUU
Computer Management								_ 🗆 ×
Action ⊻iew 🛛 🗢 → 🗈 💽	1 😫 🛛 🔯							
Tree	Volume	Layout	Туре	File System	Status	Capacity	Free Space	% Free
Computer Management (Local)	🗩 (F:)	Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
System Tools	🖃 (G:)	Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
System roots	💷 (H:)	Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
E Custom Information	🔍 (I:)	Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
Bastana and the	():)	Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
E - M Performance Logs and Ale	(K:)	Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
E- Shared Folders		Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
- A Device Manager		Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
E-SS Local Users and Groups		Partition	Basic		Healthy	1.00 GB	1.00 GB	100 %
- 🔤 Storage		Partition	Basic	NITEC	Healthy (Sy	10 E2 CP	1.00 GB	21.04
	SHARE (D:)	Partition	Basic	FAT32	Healthy (3y	15.99 GB	15 99 GB	100.96
📲 💕 Disk Defragmenter	- ST M (C (D .)	1 arddorf	Dasic	18132	ricardity	15.55 60	10.00 00	100 /0
Logical Drives								
🗄 🔗 Removable Storage								
- 🚱 Services and Applications								
	•							
		4						
								-
	Basic	MHALL	SHARE	(F: (G: (H:		(K: (L:	(M: (N: (0:	
	55.89 GB	19.53 G	16.00 ( 1	.00 1.00 1.00	1.00 1.00 1.	00 1.00 1	.00 1.00 1.00	10.31 G
	Online	Healthy	Healthy H	ealt Healt Healt	Healt Healt H	ealt Healt H	lealt Healt Healt	: Free Spa
		لــــــز		P P	<u>, n h</u>	12 P	17 P	┹━━━┛╺
	📕 Primary Parti	tion 📕 Extende	d Partition 📘	Free Space 📕 Logi	cal Drive			

Once complete, you should have eight 1Gbyte logical drives labelled F: through to M:, with no file system. The above illustration shows two additional 1 Gbyte drives labelled N: and O: created during the later hands on sessions.

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## 3. Creating a database running ASM

#### 3.1 **Pre-requisites**

In the next section we will use the Oracle Database Configuration Assistant (DBCA) to create a database running Automatic Storage Management (ASM). DBCA gives three choices for storage: traditional file system, raw or ASM. On selecting ASM we will create a database disk group containing two failure groups with 3 logical drives in each (this shows Oracle ASM mirroring) and 2 external groups for the redo logs (showing that we can still use external mirroring technology).

Disk Groups		Flash	backDG					
Failure Groups	FG1			FG2				
Logical Volumes	ASM1a	ASM1b	ASM1c	ASM2a	ASM2b	ASM2c	ASM3a	ASM3b

In the Windows implementation below, we will map the Logical Volumes to the eight 1Gbyte drives F: to M: created earlier.

**NOTE:** Prior to running DBCA you need to ensure that OracleCSService service is running.

#### 3.2 Creating the Database

Launch DBCA from the Start Menu.

Database Configuratio	n Assistant : Welcome	×
	Welcome to Database Configuration Assistant for Oracle database. The Database Configuration Assistant enables you to create a database, configure database options in an existing database, delete a database, and manage database templates.	
Cancel Help	S Back Next >>	

Click "Next"

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ows 2000		24 <sup>th</sup> December 20
Database Configuratio	n Assistant, Step 1 of 12 : Operations	
	Select the operation that you want to perform:	
	Create a Database	
	C Configure Database Options	
	C Delete a Database	
	C Manage Templates	
Cancel Help	) ( <u>Back</u>	ext >>)

Click "Next"

Database Configuration a	Assistant, S	tep 2 of 13 : Database Templates	
	Select a temp	late from the following list to create a database:	Includes Datafiles
	0	Data Warehouse	Yes
	9	General Purpose	Yes
	0	Custom Database	No
	0	Transaction Processing	Yes
Henrichten eine Bereichten ein			
			Show Details
Cancel Help		<u> </u>	»

Select the "General Purpose" template and click "Next"

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Database Configurati	on Assistant, Step 3 of	12 : Database Identific	cation	<u>_     ×</u>
	An Oracle database is ur domain". Global Database Name: A database is referencec other instance on this co	iquely identified by a Global ORCLASM I by at least one Oracle instar mputer by an Oracle System	Database Name, typically of th nce which is uniquely identifier Identifier (SID).	e form "name. d from any
	SID:	ORCLASM		
Cancel Help	)			

Enter your Global Database Name and click "Next". In our example we have called the database Oracle – ORCL Automatic Storage Management – ASM.

🛑 Database Configurat	ion Assistant, Step 4 of 12 : Mana	gement Options	_ 🗆 🗙			
	Each Oracle database may be manag Control or locally using the Oracle Ent management option that you would lik	ed centrally using the Oracle Enterprise Manage erprise Manager Database Control. Choose the æ to use to manage this database.	r Grid			
	Configure the Database with Enterprise Manager					
	C Use Grid Control for Database Management					
	Select the Management Service	No Agents Found				
Video Statement Video Statement Video Statement	Use Database Control for Database	Use Database Control for Database Management				
Line Statement	Enable Email Notifications					
Vioyal Statement	Outgoing Mail (SMTP) Server:					
Average Averag	Email Address:					
Magazing Adamson Magazing Madamson Magazing Madamson Magazing Madamson	Enable Daily Backup					
Materix 2000 Annous Materix 2000 Annous	Backup Start Time:	02 🖕 00 🖕 🖲 AM C PM				
	OS Username:					
	Password:					
Cancel Help	)	<u> </u>				

Ensure that "Configure the Database with Enterprise Manager" is checked and click "Next"

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	Password:	******	
	Confirm Password:	******	
	O Use Different Passwo	ords	
	User Name	Password	Confirm Password
1	SYS		
	SYSTEM		
	DBSNMP		
	SYSMAN		
	l		

Select "Use the Same Password for All Accounts" and enter a password of your choice and click "Next"

Database Configuration	Assistant, Step 6 of 14 : Storage Options
	<ul> <li>Select the storage mechanism you would like to use for the database.</li> <li>File System Use the File System for Database storage.</li> <li>Automatic Storage Management (ASM) Automatic Storage Management (ASM) Automatic Storage Management implifies database storage administration and optimizes database layout for I/O performance. To use this option you must either specify a set of disks to create an ASM disk group or specify an existing ASM disk group.</li> <li>Raw Devices Raw partitions or volumes can provide the required shared storage for Real Application Clusters (RAC) databases if you do not use Automatic Storage Management and a Cluster File System is not available. You need to have created one raw device for each datafile, control file, and log file you are planning to create in the database.</li> <li>Bpecify Raw Devices Mapping File Browse</li> </ul>
Cancel Help	<u> </u>

We wish to use Automatic Storage Management so select "Automatic Storage Management (ASM)" and click "Next".

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#### Click "Next"

Database Configuration	Assistant, Step 7 of 14 : Create ASM Instance	
	In order to use Automatic Storage Management(ASM), you need to have an ASM instance on your machine. There are no ASM instances running on this machine. Use this page to parameters for a new ASM instance which will be created when you click Next. The default settings for creating an ASM instance work for most installations. If you would make changes to the defaults, use the ASM Parameters button. (ASM Parameters) The new ASM instance has its own SYS user for remote management. Specify the passw that user. SYS password: Confirm SYS password:	running specify like to ord for
Cancel Help	<u> </u>	

Enter a password for the SYS user of the ASM instance and click "Next".



**Click OK** 



Whilst ASM Instance Creation is in progress you will see the above dialog box.

Database Configuration	Assistant, Select one or a new disk g	Step 7 of 13 : ASM more disk groups to be roup or add disks to an Dick Groups	Disk Groups e used as storage fr existing disk group	or the database. You	can choose to create
Harman and Harman and	Available Select	Disk Group Name	Size (MB)	Free (MB)	Redundancy
Cancel Help				≪ Back Next	»

Once the ASM instance has been created, a dialog box is brought up which allows us to set up available disk groups. Currently we have no disk groups and we need to create them from new. Click Create New.

🛑 Create Disk Group				×
Disk Group Name:				
<ul> <li>Redundancy</li> </ul>				
CHigh	Normal		○ Externa	al
- Select Member Disks				
Show Candidates      Show All				
Disk Path	Header Status	ASM Name	Failure Group	Size (MB)
1.1.1 N.1.1	CANDIDATE			57231
Note: If you don't see disks which y path.	ou believe shoul	d be available, yo	ou may need to cl	hange the disk discovery ange Disk Discovery Path)
	ОК	Cancel Help		

The Create Disk Group dialog shows the whole hard drive as the only candidate. To show the logical drives we created earlier we will need to change ASM's disk discovery path. Click Change Disk Discovery Path.

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Change Disk Discover	'y Path	×
Changing the disk discovery (	path will affect ALL disk groups.	
Disk Discovery Path: 11.1*:		
	OK Cancel Help	

#### Enter $\backslash \backslash . \rangle *$ : and click OK.

High		Normal		◯ Extern	al
Select Me	mber Disks —				
Show C	andidates OSh	.ow All			
Di	sk Path	Header Status	ASM Name	Failure Group	Size (MB)
	.D:	CANDIDATE			16386
	F:	CANDIDATE			1027
	.G:	CANDIDATE			1027
	H:	CANDIDATE			1027
	l:	CANDIDATE			1027
	J:	CANDIDATE			1027
	K:	CANDIDATE			1027
	L:	CANDIDATE			1027
	M:	CANDIDATE			1027
	.C:	CANDIDATE			20002
Lata - 16					
lote: If yo	u don't see disks	which you believe shou	ld be available,	you may need to c	hange the disk discover;

You will now see all the logical drives. NOTE: you may have to select "Show All" and then "Show Candidates" to refresh the display

k Group Name: Data	baseDG			
Redundancy				
DHigh	High 🖲 Normal			al
Show Candidates	Show All			
Disk Path	Header Status	ASM Name	Failure Group	Size (MB)
(NAD:	CANDIDATE			16386
🔽 (0.0F)	CANDIDATE	ASM1a	FG1	1027
🔽 11.1G:	CANDIDATE	ASM1b	FG1	1027
IV.VH:	CANDIDATE	ASM1c	FG1	1027
₩.M.	CANDIDATE	ASM2a	FG2	1027
💌 11.U:	CANDIDATE	ASM2b	FG2	1027
🗹 W.K:	CANDIDATE	ASM2c	FG2	1027
□ \\\\L:	CANDIDATE			1027
🔲 W.M:	CANDIDATE			1027
□ 11.1C:	CANDIDATE			20002
N.VM:       N.VC:	CANDIDATE CANDIDATE sks which you believe shou	d be available, y	you may need to c	1027 20002 hange the disk discove

WARNING: In our example, you must not use D: or C: as these are real disks containing Windows filesystems. To check this you should look in Windows Disk Manager at the Filesystem column (see start of section 2.2). If you choose real disks you will probably lose the data an tham

Enter DatabaseDG for the Disk Group Name and ensure that "Normal" redundancy is selected

Select the check boxes next to logical drives F: through K: and enter the ASM names and Failure Group details as in the illustration above

We will create two failure groups FG1 and FG2 and assign three 1Gbyte drives to each. ASM1a, ASM1b and ASM1c will be members of FG1 and ASM2a, ASM2b and ASM2c will be members of FG2. Once complete click OK.



The above dialog box will appear whilst the ASM Disk Group is being created.

Database Configuration	Assistant, S	Step 7 of 13 : ASM	Disk Groups		_ 🗆 🗙
	Select one or a new disk gr Available I	more disk groups to be oup or add disks to an Disk Groups	used as storage f existing disk group	or the database. You	can choose to create
	Select	Disk Group Name	Size (MB)	Free (MB)	Redundancy
		DATABASEDG	6162	6054	NORMAL
Versite and Annual Annua	Create N	Add Disks			
Cancel Help			C	≪ Back Next	»)

We now wish to create a second disk group for the Flashback Recovery Area.

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lig	h	O Normal		®Б	dernal	
lec 2bc	t Member Disks —	now All				
5110	Disk Path	Header Status	ASM Name	Size (MB)		
	WAD:	CANDIDATE		16386		
•	WAL:	CANDIDATE	ASM3a	1027		
•	30.3M:	CANDIDATE	ASM3b	1027		
	11.1C:	CANDIDATE		20002		
te: I th.	lfyou don't see disks	which you believe shou	ld be available,	you may need	d to change the	disk discove

Enter FlashbackDG for the Disk Group Name and ensure that "External" redundancy is selected, this indicates that we will use external mirroring.

Select the check boxes next to logical drives L: and M: and enter the ASM names and Failure Group details as in the illustration above. Once complete click OK.

Database Configuration	Assistant, : Belect one or a new disk gr Available	Step 7 of 13 : ASM more disk groups to be oup or add disks to an Disk Groups	Disk Groups e used as storage f existing disk group	or the database. You	can choose to create
	Select	Disk Group Name	Size (MB)	Free (MB)	Redundancy
		DATABASEDG	6162	6054	NORMAL
		FLASHBACKDG	2054	2002	EXTERN
And Andrew State S					
	Create 1	Vew Add Disks			
Cancel Help			C	≪ Back Next	»)



DOCUMENT BASED ON BETA CODE Configuring Oracle10g Automatic Storage Management Draft 1E Single Node Installation on Windows 2000 24<sup>th</sup> December 2003 Database Configuration Assistant, Step 8 of 13 : Database File Locations \_ 🗆 🗙 Specify locations for the Database files to be created O Use Database File Locations from Template O Use Common Location for All Database Files Database Files Location: Browse... Use Oracle-Managed Files Database Area: +DATABASEDG Browse... ) Multiplex Redo Logs and Control Files... ) If you want to specify different locations for any database files, pick either of the above options and use the Storage page to specify each location. File Location Variables... ) Cancel ) Help ≪ <u>B</u>ack Next  $\gg$ 

Select "Use Oracle-Managed Files" and ensure that the Database Area is set to +DATABASEDG then click "Next".

Database Configuration	Assistant, Step 9 of 13 : Recov	very Configuration	
	Choose the recovery options for the d ✓ Specify Flash Recovery Area This is used as the default for all H automatic backup using Enterpris recovery files be located on physic Flash Recovery Area: Flash Recovery Area Size: ✓ Enable Archiving	atabase: Dackup and recovery operations, e Manager. Oracle recommends ally different disks for data prote +FLASHBACKDG 2048 Edit Archive Mode Parameter	and is also required for that the database files and ction and performance. Browse) (M) Bytes (M) rs)
			File Location Variables
Cancel Help		🔇 Back	Next >>

Check "Specify Flash Recovery Area", set the name to +FLASHBACKDG and set the Size to 2048 M Bytes. The default in the drop down list is Bytes so make sure that M Bytes is chosen. Check "Enable Archiving" and click "Next".

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Database Configuration A	Assistant, Step 10 of 13 : Database Content
	Sample Schemas Custom Scripts Sample Schemas Custom Scripts Sample Schemas Illustrate the use of a layered approach to complexity, and are used by some demonstration programs. Installing this will give you the following schemas in your database: Human Resources, Order Entry, Online Catalog, Product Media, Queued Shipping, Sales History. It will also create a tablespace called EXAMPLE. The tablespace will be about 130 MB. Specify whether or not to add the Sample Schemas to your database.           Image: Schemas
Cancel Help	(⊰ Back Next ≫)

Ensure that "Sample Schemas" is checked and click "Next".

	Memory	Sizing	Character Sets	Connection Mode	
	O Typical - Allocate i	memory as a per	centage of the total ph	ysical memory (1023 MB)	
	Percentage: 70				
	Show Memory	Distribution )			
	Custom				
	Shared Memory	Management: ·	🖲 Automatic 🔿 Manua	il	
4	SGA Size		256	M Bytes 🔻	
	PGA Size:	[	24	M Bytes 👻	
	Total Memory for i Total me paramet	· Oracle: 3 mory includes 4( ers, if any.	20 M Bytes IMB of Oracle Process	s Size and the defaults for the empty	

Select "Automatic" for Shared Memory Management and enter an appropriate SGA size in M Bytes. We have chosen 256 M Bytes. Click "Next".

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2000	
Database Configuratior	Assistant, Step 12 of 13 : Database Storage
Storage	Database Storage           From the Database Storage page, you can specify storage parameters for the database creation. This page displays a tree listing and summary view (multi-column lists) to allow you to change and view the following objects: <ul> <li>Control files</li> <li>Tablespaces</li> </ul>
	Datafiles     Rollback Segments     Redo Log Groups From any object type folder, click <b>Create</b> to create a new object. To delete an object, select the specific object from within the object type folder and click <b>Delete</b> . Important: If you select a database template including data files, you will not be able to add or remove data files, tablespaces, or rollback segments. Selecting this type of template allows
	you to change the following: <ul> <li>Destination of the datafiles</li> <li>Control files or log groups.</li> </ul>
Create Delete	File Location Variables)
Cancel Help	Sack Next >)

At this point you may be interested in the locations of various files, if you are select the appropriate branches in the tree on the left. Once you are ready to create your database click "Next".

Database Configuration	Assistant, Step	0 13 of 13 : Creatio	n Options	<u>_ 🗆 ×</u>
	Select the database	se creation options: labase Database Template ORCLASM		
Cancel Help			C Back Nex	t >) <u>Einish</u>

Ensure that "Create Database" is checked and click "Next".

- 1

Confirmation			×
The following operations will be p A database called "ORCLASM" v	erformed: vill be create	ed.	
Database Details:			
Guue this database template to	enera create a pre	al Purpose -configured database optimized for general purpose usage.	
Option	Selected		ı
Oracle JVM	true		
Oracle Intermedia	true		
Oracle XML DB	true		
Oracle OLAP	true		
Oracle Spatial	true		
Oracle Data Mining	true		
Oracle Text	true		
Oracle Ultra Search	true		
Oracle Label Security	false		-
. (	ок	(Save as an HTML ancel) (Help)	file

Click OK.



You will see progress from Copying database files...



 $\ldots$  to Creating and starting Oracle instance  $\ldots$ 

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... to Completing Database Creation.

📕 Database	Configuration Assistant
Ŀ	ORA-06550: line 1, column 29: PLS-00553: character set name is not recognized ORA-06550: line 0, column 0: PL/SQL: Compilation unit analysis terminated
	(OK)

If you see this error, it is a known bug and can be safely ignored. Click OK.



Clone database creation will continue.

Database	Configuration Assistant : Error
Ŀ	Enterprise manager configuration failed due to the following error - DBConsole is already configured for the database TENG You can retry configuring this database with Enterprise Manager later by manually running C: \oracle\ora101\bin\ernca script.
	ОК

If you see the above message, then you have a previously installed database and you will need to run EMCA –r to allow Enterprise Manager to manage your Oracle ASM database instance.



## We wish to unlock some accounts for testing purposes. Click Password Management.

User Name	Lock Account?	New Password	Confirm Password	
MDDATA	×			
WK_TEST	×			
PM	× .			
WKSYS	×			
BI	× .			
WMSYS	× .			
SCOTT		*****	*****	
DMSYS	×			
EXFSYS	×			
ORDSYS	×			
MDSYS	×			

Unlock HR, OE and SCOTT giving them appropriate passwords. Click OK. You now have an Oracle Database ORCLASM running with Automatic Storage Management.

## 4. Hands on One – viewing ORCLASM in Enterprise Manager

If you received an error message regarding support for the DBConsole then try running:

emca -r

To check which port DBConsole is running on you can use

netstat -a

If this initially succeeded then the port is probably 5500. Since we had to re-run EMCA our port is 5501. You will be told this port number if you run EMCA and it is also stored in

 $\label{eq:config} \\ \label{eq:config} \\ \lab$ 

Launch Internet Explorer from the desktop.

Torace Enterprise Manager - Microsoft Internet Explorer	_ 121 ×
jie Edit View Favorites Tools Help	
ÞBack ▼ → ▼ 🞯 🙋 📅   ©Q,Search 🖻 Favorites 💖 Media 🍪   🖄 ▼ 🎒 🗺 ▼	
ddress 🙆 http://localhost:5501/em/console/logon/logon;jsessionid=0c35dacfd7ac44c0b3a78edca149c54f	▼ @Go Links *
ORACLE	Help 🔶
Login	
Learin to Detabase: OBOLASM	
Login to Database. ORGLASM	
* User Name sys	
* Password	
Connect As SYSDBA	
Login	
Copyright © 1996, 2003, Oracle. All rights reserved.	

Navigate to http://localhost:5501/em and login as SYS with <code>SYSDBA</code> privileges

Once the DBConsole has swapped into memory you should see the following:

Configuring Oracle10g Automatic Sto	orage Management	DOCUM	IENT BASED ON	BETA CODE	Draft 1E	
Single Node Installation on Windows	s 2000			<b>24</b> <sup>tt</sup>	h December 2003	
<u>a</u>	Oracle Enterprise Manager (SYS) - Da	atabase: ORCLAS	M - Microsoft Internet Explorer		_ <u>-</u>	
Ð	le <u>E</u> dit <u>V</u> iew F <u>a</u> vorites <u>T</u> ools <u>H</u> elp				<b>88</b>	
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Ac	idress 🕘 http://localhost:5501/em/consc	le/database/instance	e/sitemap?event=doLoad⌖=ORC	CLASM&type=oracle_database&pageNum=1 <u>▼</u> ∂0	60 Links "	
c l	Enterprise Manage	r		<u>Setup</u> <u>Preferences</u> <u>Help</u> <u>Lo</u> Databas	gout 🔺	
•				Logged in A	3 SYS	
[	Database: ORCLASM					
	Home Performance Administratio	<u>Maintenance</u>				
	Latest Data Collected From Target 06-Nov-2003 06:08:16 (R View Data Real Time: Manual Refres					
	General		Host CPU	Active Sessions		
	Status Up Up Since 06-Nov-200 Time Zone GMT Availability (%) 0.07 (Last 24 hours) Instance Name orclasm Version 10.1.0.1.0 Host DHCP-Manu. 181_uk.orac Listener LISTENER Oracle Home C:\oracle\or Alert Log No ORA- er		100%, 75 50 25 0 Run Queue 4.0 Paging (pages per second)	No data is corrently available. Active Sessions Unavailable SQL Response Time (%) Commerce to base	e e seline)	
	Space Usage	Advice	High Availability	Job Activity		
	Problem V 0	No	Last Backup n/a	Scheduled Executions 0	<b>•</b>	
6				📴 Local intranet		

Click Administration **è** Storage **è** Datafiles to see how ASM is used.

🎒 Datafile	s - Microsoft Internet Explorer							8 ×
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ORACL	ORACLE Setup Preferences Help Logout							
Enterprise Manager				Da	tabase			
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Database	e: ORCLASM > Datafiles					Logged i	n As SY:	s
Dataf	iles							
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Exampl	le: Entering Test will return all items beginning with upper case T	EST, i.e. TEST	A, except fo	or Java Source	and Java Class which u	use case sensitiv	e searches	
Use do	uble quotes to preserve case and embed wildcards(%).							
Resu	ılts							
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Selec	t File Name	Tablespace	Status	Size (MB)	Jsed (MB) Used (	%)		
e	+DATABASEDG/orclasm/datafile/sysaux.257.1	<u>SYSAUX</u>	ONLINE	190.000	184.875		97.30	2
0	+DATABASEDG/orclasm/datafile/system.256.1	SYSTEM	SYSTEM	440.000	435.000		98.86	õ
0	+DATABASEDG/orclasm/datafile/undotbs1.258.1	UNDOTBS1	ONLINE	30.000	27.375		91.2	5
0	+DATABASEDG/orclasm/datafile/users.259.1	USERS	ONLINE	5.000	2.750		55.00	J
0	+DATABASEDG/orclasm/example01.dbf	EXAMPLE	ONLINE	150.000	77.938		51.9	5
0	+DATABASEDG/orclasm/tempfile/temp.264.1	IEMP	UNLINE	23.000	.000		0.00	
Database   Setup   Preferences   Help   Logout								
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We have already configured Flashback Database so follow "Performing Backups and Recovering Your Database OBE" by selecting Flashback Database and going to step2. For information, you may wish to follow step 1, but it is already set.

Details of this OBE are available at http://database.us.oracle.com by selecting the 10g tab and then the OBEs tab.

Congratulations! You have a fully implemented 10g database running on Automatic Storage Management viewable in Enterprise Manager.

## 5. Hands On Two – Add and Remove Disk Groups. Force a failure.

In deference to all the DBA and Sys Admins out there Hands On Two in contrast to Hands On One is dedicated to those with a command line persuasion.

#### 5.1 **Pre-requisites**

In order to carry out this Hands On we need two more logical drives. If you are unsure how to do this please refer to section 2.

In our example, we have two further 1Gbyte logical drives labelled N: and O:

#### 5.2 Add a disk group

To add a disk group we need to manipulate the OSM instance.

#### From a DOS command prompt:

set ORACLE\_SID = +OSM
sqlplus / as sysdba

#### Check current settings:

SQL> select name, total\_mb, failgroup from v\$osm\_disk where name is not null; NAME TOTAL\_MB FAILGROUP \_\_\_\_\_ \_ \_\_\_\_\_ ASM1A 1027 FG1 ASM1B 1027 FG1 ASM1C 1027 FG1 ASM2A 1027 FG2 ASM2B 1027 FG2 ASM2C 1027 FG2 ASM3A 1027 ASM3A ASM3B 1027 ASM3B 8 rows selected.

We will add one logical drive to failure group FG1 with a name of ASM1D and one logical drive to failure group FG2 with a name of ASM2D.

SQL> alter diskgroup databasedg add failgroup FG1 disk '\\.\N:' NAME ASM1D failgroup FG2 disk '\\.\O:' NAME ASM2D; SQL>select name, total\_mb, failgroup from v\$osm\_disk where name is not null order by name; NAME TOTAL\_MB FAILGROUP ASM1A 1027 FG1 1027 FG1 ASM1B ASM1C 1027 FG1 1027 FG1 ASM1D ASM2A 1027 FG2 1027 FG2 ASM2B ASM2C 1027 FG2 1027 FG2 ASM2D ASM3A 1027 ASM3A ASM3B 1027 ASM3B

10 rows selected.

## You may if you wish check the dump file (alert\_+osm.log), it should contain entries similar to the following:

Thu Nov 06 17:37:15 2003 ORBO relocating file +DATABASEDG.258.1 (4 entries) ORBO relocating file +DATABASEDG.261.1 (2 entries) ORBO relocating file +DATABASEDG.262.1 (2 entries) ORBO relocating file +DATABASEDG.263.1 (1 entries) ORBO relocating file +DATABASEDG.264.1 (3 entries) ORBO relocating file +DATABASEDG.265.1 (46 entries) Thu Nov 06 17:37:36 2003 RBAL stopping process ORBO RBAL rebalance completed, gn=1 checking for empty OSM disks, gn=1 We will now drop the disk that we have added

SQL>alter diskgrou SQL> select name, where name is not	<pre>up databasedg dro total_mb, free_m null order by na</pre>	p disk ASM1I b,total_mb - me;	D,ASM2D; - free_ml	o "left", fail	lgroup from	v\$osm_disk
NAME	TOTAL_MB	FREE_MB	left	FAILGROUP		
ASM1A	1027	701	326	FG1		
ASM1B	1027	708	319	FG1		
ASM1C	1027	714	313	FG1		
ASM2A	1027	696	331	FG2		
ASM2B	1027	714	313	FG2		
ASM2C	1027	713	314	FG2		
ASM3A	1027	928	99	ASM3A		
ASM3B	1027	933	94	ASM3B		

You may if you wish check the dump file (alert\_+osm.log), it should contain entries similar to the following:

Thu Nov 06 17:18:48 2003 ORB0 relocating file +DATABASEDG.256.1 (23 entries) ORB0 relocating file +DATABASEDG.257.1 (45 entries) Thu Nov 06 17:19:14 2003 ORB0 relocating file +DATABASEDG.258.1 (6 entries) ORB0 relocating file +DATABASEDG.261.1 (1 entries) ORB0 relocating file +DATABASEDG.262.1 (1 entries) ORB0 relocating file +DATABASEDG.263.1 (2 entries) ORB0 relocating file +DATABASEDG.264.1 (3 entries) ORB0 relocating file +DATABASEDG.265.1 (45 entries) Thu Nov 06 17:19:37 2003 RBAL stopping process ORB0 RBAL rebalance completed, gn=1 checking for empty OSM disks, gn=1 OSM disk ASM2D successfully emptied OSM disk ASM1D successfully emptied

#### 5.4 Simulate a failure group failure

We will now "kill" failure group FG2 by forcing a drop:

SQL> alter diskgroup databasedg drop disks in failgroup FG2 FORCE;

You can monitor how this works by running the query from above to see how the remastering etc. is going. Also the logs contain useful information as follows:

```
Thu Nov 06 17:51:40 2003
RBAL CIC release invoked, gn=1, full=0
Thu Nov 06 17:51:40 2003
Determining relations for group DATABASEDG
Determining partners for group DATABASEDG
ORA relocating file +DATABASEDG.1.1 (2 entries)
ORA relocating file +DATABASEDG.2.1 (1 entries)
ORA relocating file +DATABASEDG.3.1 (42 entries)
Thu Nov 06 17:51:41 2003
RBAL re-discovering group 1/0x200AF83 (DATABASEDG), full=0
Thu Nov 06 17:51:41 2003
ORA relocating file +DATABASEDG.4.1 (2 entries)
ORA relocating file +DATABASEDG.5.1 (1 entries)
ORA relocating file +DATABASEDG.6.1 (1 entries)
ORA relocating file +DATABASEDG.256.1 (120 entries)
ORA relocating file +DATABASEDG.256.1 (120 entries)
ORA relocating file +DATABASEDG.256.1 (120 entries)
ORA relocating file +DATABASEDG.256.1 (82 entries)
ORA relocating file +DATABASEDG.257.1 (120 entries)
ORA relocating file +DATABASEDG.257.1 (72 entries)
ORA relocating file +DATABASEDG.258.1 (31 entries)
ORA relocating file +DATABASEDG.259.1 (6 entries)
ORA relocating file +DATABASEDG.260.1 (8 entries)
ORA relocating file +DATABASEDG.261.1 (16 entries)
ORA relocating file +DATABASEDG.262.1 (16 entries)
ORA relocating file +DATABASEDG.263.1 (16 entries)
ORA relocating file +DATABASEDG.264.1 (24 entries)
ORA relocating file +DATABASEDG.265.1 (120 entries)
ORA relocating file +DATABASEDG.265.1 (32 entries)
ORA relocating file +DATABASEDG.266.1 (1 entries)
Thu Nov 06 17:51:42 2003
group DATABASEDG: relocated PST to:
disk 0003 (PST copy 0)
Thu Nov 06 17:51:42 2003
RBAL queued rebalance (power 1) for group 1/0x200AF83 (DATABASEDG)
RBAL CIC discovery already done, gn=1
```

RBAL resuming rebalance of group 1/0x200AF83 (DATABASEDG) Starting background process ORB0 ORB0 started with pid=11, OS id=1908

Finally, you will end with only one Failure Group and the database will continue to run:

Thu Nov 06 17:52:35 2003 ORBO relocating file +DATABASEDG.258.1 (16 entries) ORBO relocating file +DATABASEDG.259.1 (3 entries) ORBO relocating file +DATABASEDG.260.1 (4 entries) ORBO relocating file +DATABASEDG.261.1 (8 entries) ORBO relocating file +DATABASEDG.262.1 (8 entries) ORBO relocating file +DATABASEDG.263.1 (8 entries) ORBO relocating file +DATABASEDG.264.1 (12 entries) ORBO relocating file +DATABASEDG.265.1 (77 entries) ORBO relocating file +DATABASEDG.266.1 (1 entries) Thu Nov 06 17:52:52 2003 RBAL stopping process ORBO RBAL rebalance completed, gn=1 Thu Nov 06 17:52:53 2003 group DATABASEDG: relocated PST to: disk 0003 (PST copy 0) Thu Nov 06 17:52:53 2003 checking for empty OSM disks, gn=1 OSM disk ASM2A successfully emptied OSM disk ASM2B successfully emptied OSM disk ASM2C successfully emptied

Congratulations! You have successfully implemented ASM, have added and removed disks and have simulated a failure. All with zero downtime.